CTEH®

THE SCIENCE OF READY℠

Nashville Airport Gasoline Pipeline Release

Nashville, TN

Preliminary Air Sampling and Analysis Plan (SAP)

Version 1.0

Prepared on Behalf of:

Colonial Pipeline

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Air Monitoring and Sampling Strategy

CTEH® is focusing on the chemicals, and indicators of flammability chosen below because they are among the most important and readily monitored hazards of spilled or released gasoline. The possible hazards of gasoline vary with the environmental conditions associated with the spill. Monitoring and sampling for some chemicals or indicators of the presence of gasoline may be conducted less frequently or even discontinued as product-specific information becomes available or as initial monitoring and sampling results indicate that these chemicals and indicators do not pose a health concern.

The strategy is to utilize three broadly defined monitoring plans: **1)** Worker Activity Monitoring; **2)** Community Monitoring; **3)** Site Assessment. Worker Activity monitoring will generally take place in the presence of workers performing/supporting remediation operations. The readings will generally be taken at a height consistent with that of the samplers breathing zone and in close proximity to workers without interfering or obstructing their remediation tasks. Community Monitoring may take place in those residential and commercial locations immediately surrounding the incident site, not necessarily currently occupied by members of the community. Unlike Worker Activity and Community monitoring, Site Assessment does not necessarily represent ambient air monitoring near breathing zone level. Site Assessment may involve a variety of different monitoring tasks intended to provide information that may help to delineate the nature and extent of the release (e.g. fence line monitoring, worst case determination, container head space, ground level, etc.).

Free-roaming handheld real-time air monitoring may be conducted in a variety of areas based on levels of activity, proximity to the release, and site conditions. Fixed-location handheld real-time locations may be established in the Community in order to provide concentration averages that may be observed and analyzed over time in distinct geographic locations in the community.

Radio-telemetering RAE Systems® AreaRAE/AreaRAE Plus units may be deployed in all monitoring plans to allow for continuous air monitoring in multiple areas. AreaRAE/AreaRAE Plus readings may be received and monitored in a centralized location by CTEH® personnel to allow for recognition, communication, and response to changing conditions.

Discrete air samples may be collected in all monitoring areas and sent to an off-site laboratory for chemical analysis. These analytical air sampling techniques may be used to provide air quality data beyond the scope of real-time instruments. When necessary, discrete air samples may be collected on individual workers (personal sampling) to provide exposure data over the course of a work shift for more direct comparison to occupational exposure values.

CTEH Site-Specific Action Levels

CTEH® site-specific action levels may be employed in all air monitoring plans to provide information for corrective action to limit potential exposures. These values do not replace occupational or community exposure standards or guidelines, but are intended to represent a concentration limit that triggers a course of action to better address worker and public safety. Action level exceedances will be communicated to Site Management and the CTEH Project Technical Director by the CTEH Project Manager (PM). Work practice may be assessed and then altered if necessary. Site-Specific Action Levels are not utilized for Site Assessment monitoring.

Plan 1: Worker Monitoring

Objective: Report air levels before they reach those requiring respiratory protection or other precautionary actions.

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	30 ppm 15 min.	Assess for the presence of benzene/toluene/hexane, Report reading to PM	To avoid over exposure to benzene / toluene / hexane	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring range: 1 – 5,000 ppm	NA
	300 ppm 15 min.	Don respirator or evacuate area; Report reading to Site Management.	ACGIH® TLV-TWA	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring range: 1 – 5,000 ppm	NA
Benzene	0.5 ppm 15 min.	Confirm reading with secondary instrument, Exit Area or don air purifying respirator; report reading to PM	OSHA PEL Action level	UltraRAE PID	0.025 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1 – 65 ppm Volume: Variable	Var.
	2.5 ppm 15 min	Confirm reading with secondary instrument, Exit Area or don air purifying respirator; report reading to PM	ACGIH STEL	UltraRAE PID	0.025 ppm	UltraRAE - Change SEP tube frequently	0.55
				Gastec tube #121L	0.05 ppm	Range: 0.1 – 65 ppm Volume: Variable	Var.
Gasoline	300 ppm	Exit Area or don air purifying respirator; report reading to PM	ACGIH TLV	Gastec tube #101L	5 ppm	Measuring Range: 30 – 1,000 ppm	NA
Toluene	20 ppm	Sample only as requested, Report reading to PM	ACGIH TLV	Gastec tube #122L	0.5 ppm	Range: 1 – 100 ppm Volume: Var.	Var.
Hexane	50 ppm	Sample only as requested, Report reading to PM	ACGIH TLV (n-hexane)	Gastec tube #102L	1 ppm	Range: 4 – 1,200 ppm Volume: Variable	Var.

Flammability

Analyte	Action Level	Corrected Value/ Instrument Reading	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
LEL	10 % 1 min	3.8 %	Exit area and Notify PM	Elevated LEL	MultiRAE Sensor AreaRAE Sensor	2.6 %	Measuring range: 1 – 100%	2.5*
VOCs	1,300 ppm 1 min	10 %	Exit area and Notify PM	Elevated LEL	MultiRAE PID AreaRAE PID	1 ppm	Measuring range: 1 – 100%	0.9**

*For gasoline
**0.9 for gasoline PID

Plan 2: Community Assessment

Objective: Report levels that minimize nuisance odor in the community and evaluate.

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	0.2 ppm 15 minutes	Report reading to PM. Assess for the presence of benzene/toluene/hexane, if requested	Reading Sustained for 15 minutes. Gasoline Odor Threshold; Colonial Air Monitoring Protocol	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring range: 1 – 5,000 ppm	NA
	100 ppm 30 minutes	Report reading to PM. Assess for the presence of benzene/toluene/hexane, if requested	Reading sustained for 30 minutes*. ½ Gasoline-specific Emergency Response Planning Guidelines (ERPG)-1** value	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring range: 1 – 5,000 ppm	NA
Gasoline	0.2 ppm	Report reading to Site Management. Assess the presence of benzene.	Reading Sustained for 15 minutes. Gasoline Odor Threshold; Colonial Air Monitoring Protocol	Gastec tube #101L	5 ppm	Measuring Range: 30 – 1,000 ppm	NA
Benzene	0.05 ppm	Sample only as requested, Report reading to PM	Reading Sustained for 15 minutes. Gasoline Odor Threshold; Colonial Air Monitoring Protocol; Inform PM/PTD of potential off-site issues	UltraRAE PID	0.025 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1 – 65 ppm Volume: Variable	Var.
Toluene	0.5ppm	Sample only as requested, Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube #122L	0.5 ppm	Range: 1 – 100 ppm Volume: Variable	Var.

Flammability

Analyte	Action Level	Corrected Value/ Insturment Reading	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
LEL	10 % 1 min	3.8 %	Exit area and Notify PM	Elevated LEL	MultiRAE Sensor AreaRAE Sensor	2.6 %	Measuring range: 1 – 100%	2.5*
VOCs	1,300 ppm 1 min	10 %	Exit area and Notify PM	Elevated LEL	MultiRAE PID AreaRAE PID	1 ppm	Measuring range: 1 – 100%	0.9**

*For gasoline
**0.9 for gasoline PID

Plan 3: Site Assessment

Objective: Characterize nature and extent of release

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	NA	Report reading to PM	NA	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring range: 1 – 5,000 ppm	NA
Benzene	NA	Report reading to PM	NA	UltraRAE PID Gastec tube #121L	0.025 ppm 0.05 ppm	UltraRAE - Change SEP tube frequently Range: 0.1 – 65 ppm Volume: Variable	NA Var.
Toluene	NA	Report reading to PM	NA	Gastec tube #122L	0.5 ppm	Range: 1 – 100 ppm Volume: Variable	Var.
Hexane	NA	Report reading to PM	NA	Gastec tube #102L	1 ppm	Range: 4 – 1,200 ppm Volume: Variable	Var.

Analytical Methods

Analyte	Media/Can	Method	Notes
VOCs	MiniCans (1L)	EPA TO-15 with TICs	
Benzene	Charcoal tube	NIOSH 1501	
BTEX (+Hexane)	3M 3520 Badge or Assay 566	Modified NIOSH 1500/1501	
PAHs (18 PNAH Profile - Galson)	37PTFE 2.0/Treated Amberlite XAD-2	Method 5506	

General Information on Procedures (Assessment Techniques) Used

Procedure	Description
Guardian Network	A Guardian network may be established with AreaRAEs equipped with electrochemical sensors at locations around the work zone perimeter. The AreaRAEs will be telemetering instantaneous data at 15-second intervals to a computer console. MultiRAE Pros may also be used in the network. The data will be visible in real-time at the computer console and will be monitored 24 hours per day by CTEH personnel.
Real-Time Handheld Survey	CTEH staff members may utilize handheld instruments (e.g. MultiRAE Plus; ppbRAE, Gastec colorimetric detector tubes, etc.) to measure airborne chemical concentrations. CTEH will use these handheld instruments primarily to monitor the ambient air quality at breathing zone level. Additionally, measurements may be made at grade level, as well as in elevated workspaces, as indicated by chemical properties or site conditions. CTEH may also use these techniques to verify detections observed by the AreaRAE network.
Fixed Real-Time Monitoring locations	Multiple Community locations may be identified and monitored at the same location approximately once per hour using handheld instruments. This allows the use of statistical analysis more effectively than with a random approach.
Analytical sampling	Analytical sampling may be used to validate the fixed and handheld real-time monitoring data, or to provide data beyond the scope of the real-time instruments. Analytical samples may be collected as whole air samples in evacuated canisters or on specific collection media, and sent to an off-site laboratory for further chemical analysis.
Particulate Monitoring Network	A network of data-logging particulate monitors may be set up and positioned around the Community.

Quality Assurance/Quality Control Procedures

Method	Procedure
Real-Time	Real-time instruments may be calibrated in excess of the manufacturer's recommendations. At a minimum whenever indicated by site conditions or instrument readings. Co-located sampling for analytical analysis may be conducted, if necessary, to assess accuracy and precision in the field. Lot numbers and expiration dates may be recorded with use of Gastec colorimetric tubes.
Analytical	Chain of custody documents may be completed for each sample. Level IV data validation may be performed on the first sample group analyzed. Level II data validation may be performed on 20% of all samples. Level IV data validation may be performed on 10% of all samples.
Reporting	Daily data summaries may be provided for informational purposes using data that have not undergone complete QA/QC. Comprehensive reports of real-time and/or analytical data may be generated following QA/QC and may be delivered 60 days following receipt of validated results, if applicable.

Glossary

Term	Definition
Sustained	Instrument reading above the action level continuously for the listed time period.
Excursion Limit	Whenever a reading exceeds an ACGIH® TLV by 5 times (if the chemical does not have a STEL- or Ceiling-based action level), exit the area and notify the PM
Breathing zone	The area within an approximate 10-inch radius of an individual's nose and mouth.
Ambient Air	That portion of the atmosphere (indoor or outdoor) to which workers and the general public have access.

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